

A Research Bulletin

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Portable Rumble Strips Performing Well in South Central District

Business Issue

Safety is the number one priority at MoDOT – both the safety of roadway users and the employees that work on the roadway. As such, research and field studies on new, innovative products that can improve safety in any fashion have become a priority.

During the past year, MoDOT has made significant strides in reducing crashes and the resulting injuries in work zones. However, there remains room for improvement. Between 2005 and 2008, Missouri work zones experienced the following:

- 10,799 crashes;
- 3,207 minor injuries;
- 381 disabling injuries; and,
- 51 fatalities.



Specifically, over the past two construction seasons, the South Central District has suffered two tragic incidents, in which four people were killed, one of which was the contractor's flagman. In both accidents, the drivers of the vehicles were distracted and did not notice that they had entered a work zone. In order to continually improve the safety of Missouri work zones, MoDOT searches for innovative products that will assist with improving work zone notification, speed control, and inattention by the traveling public.

Approach

Recently, MoDOT was introduced to RoadQuake Temporary Portable Rumble Strips; a product sold by Plastic Safety Systems, Inc. (PSS), a popular manufacturer of work zone safety devices. RoadQuake rumble strips are an innovative option to improve work zone safety. They are specifically designed to alert drivers to slow down through significant vibratory and audible alerts.



Currently, RoadQuake is the only portable rumble strip available on the market. RoadQuake is temporary, portable and durable. Most importantly, RoadQuake improves work zone safety. At 11 feet long, 12 inches wide, and 13/16 inches thick with a 12-degree bevel on the leading edge, the temporary rumble strips alert drivers to slow down.



Approach (cont'd.)

The most innovative feature is the temporary nature of the product. RoadQuake does not require any adhesives, epoxies, fasteners or nails for installation. Current temporary rumble strips must be glued down to the pavement, which results in excessive time to install and remove, and can damage the pavement. The RoadQuake temporary rumble strips can be installed in minutes with a minimal crew and are specifically designed to withstand continual use on the roadway while remaining stationary. When the work zone is no longer needed, the strips literally can be picked up, stored, and reused at another location. Weighing only 105 pounds and incorporating ergonomic handles at each end, a crew of two can easily carry and place the product by hand. And at a length of 11- feet, the rumble strip is long enough to traverse an entire lane.

RoadQuake is produced from engineered polymer materials, making it very durable. It is an all-weather device with a non-slip textured surface designed to conform to the surface of the road without curling or otherwise deforming. In addition, because of the composition of the product, crews no longer have to wait for ideal weather to install the rumble strips.

South Central District Findings

The South Central District volunteered to provide an active work zone for a field test of the RoadQuake temporary rumble strips on December 11-12, 2008. The work zone was located on State Route 17, approximately three miles north of Mountain View, and 21 miles from the district office in Willow Springs. According to traffic counts from 2007, roughly 1,550 vehicles – including commercial vehicles – use the road daily. The field test was designed to check the stability of the RoadQuake rumble strips as well as the reaction by roadway users in terms of a reduction in speed.

RoadQuake Temporary Portable Rumble Strips Quick Specifications

Manufacturer: Plastic Safety Systems, Inc.
Cleveland, Ohio
www.plasticsafety.com
(800) 662-6338

Length: 11 feet

Width: 12 inches

Thickness: 13/16 inches with a 12-degree bevel on the leading edge.

Weight: 105 pounds

Purpose: To improve work zone safety through a product that generates a significant audible and vibratory alert to drivers.

Price: \$1,000 each, plus shipping (\$95)

In the northbound lane, which has a significant down-slope, the array consisted of four strips that were placed approximately 12 inches apart. After signs of significant shifting of the product – some up to eight inches – the gap in the northbound lane was increased to 36 inches. In the southbound lane, the array consisted of five strips placed approximately 36 inches apart. Over the course of the two-day study, no movement greater than two inches was noted in either array of rumble strips.

More importantly, the drivers reacted positively to the audible and vibratory alert produced by RoadQuake. MoDOT staff measured drivers' reaction to the rumble strips with a radar gun and measured speed reductions of five to ten miles per hour after the drivers crossed the product.



Conclusions

Based on both the PSS and MoDOT field tests, the responsiveness of drivers due to the RoadQuake product is positive. Reduced speeds of five to ten miles per hour, as well as the increased attentiveness from the audible and vibratory alert will increase safety in work zones. However, as of this publication, the field tests on the product are extremely limited. Two specific issues need further study: the effect on motorcycles and the effect of rainy conditions on the product.

The researched effect on motorcycles is not sufficient to draw an accurate conclusion. In each field trial conducted by PSS to this point, motorcycles have traversed the strips with no negative effects. Plastics Safety Systems, Inc. anticipates working with a research organization to conduct a more in-depth field study in the near future.

The effect of rainy conditions on the product are less known. To date, there has not been a field trial under rainy conditions, so cautions should be taken if using the product under rainy conditions. Nonetheless, the purpose of the product is to improve work zone safety and a majority of work zones will not be in operation during rainy conditions. With the temporary nature of the product, the RoadQuake rumble strips could simply be removed from the roadway, should rainy conditions occur.



The safety industry already has taken notice. In February 2009, RoadQuake Temporary Portable Rumble Strips received a second place "Innovation Award" from the American Traffic Safety Services Association. Undoubtedly, further field testing is necessary to verify the positive results of the South Central districts field test. However, the value of RoadQuake temporary, portable rumble strips is clear.